Research Paper | Engineering | E-ISSN No : 2454-9916 | Volume : 10 | Issue : 10 | October 2024

EXPLORATION AND PRACTICE OF THE CONSTRUCTION OF INNOVATION PLATFORM FOR THE CULTIVATION OF CHEMICAL ENGINEER TALENTS UNDER THE BACKGROUND OF "NEW ENGINEERING"

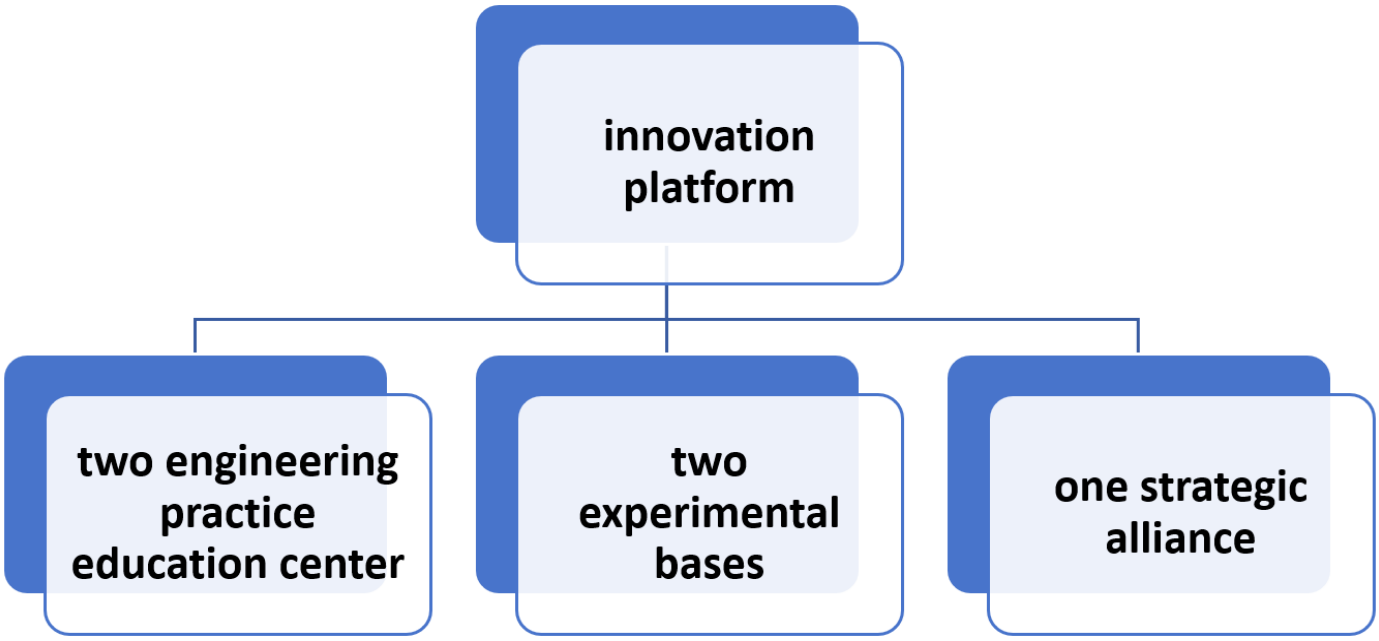
Hua Li[1], *Xiaoshuang Chen[2], Yadong Zhang[3]

[1,3]School of Chemical Engineering, Zhengzhou University, Zhengzhou, China.
[2]School of Mechanical and Power Engineering, Zhengzhou University, Zhengzhou, China.(Corresponding Author)

ABSTRACT

According to the existing situation in the construction of innovation platform for talents training in colleges and universities under the background of new engineering, collaborative education mode was explored in Zhengzhou University, combined with the actual characteristics of chemical engineer speciality, with the background of new engineering, and the cultivation of innovative spirit and practical ability as the core, integration of enterprises with vocational schools and universities as new teaching mode, through the construction of a new engineering practice education center, the construction of a talent training experimental base, and the construction of a strategic alliance for the integration of industry and education under the background of new engineering, a new way for the deep integration of industry and education to promote the construction of an innovation platform for the cultivation of chemical talents under the background of "new engineering" were explored, which promotes the organic connection of education chain, talent chain, industrial chain and innovation chain. It lays a theoretical foundation for the combination of traditional engineering education and "new engineering" education, as well as for cultivating high-quality talents with innovative spirit and entrepreneurial consciousness.

GRAPHICAL ABSTRACT:



KEYWORDS: New engineering; chemical engineer; Talent cultivation; practice Innovation platform;

1. INTRODUCTION

With the rise of a new industrial and technological revolution, all industries are facing opportunities and challenges of industrial transformation and upgrading. With the rise of a large number of emerging industries, new requirements are also put forward for the training of traditional chemical professionals: In the future, emerging industries and new economy need high-quality "new engineering" talents with strong practical ability, strong innovation ability and international competitiveness1-10. In order to deal with the new opportunities and challenges faced by the new scientific and technological revolution and industrial transformation, the "new engineering concept" is put forward11-14. Around the construction of new engineering speciality, the Ministry of Education of China has not only approved new engineering speciality such as big data, artificial intelligence, robot engineering, and cyberspace security, but also provided a new way for the construction of traditional engineering speciality through the industry-university-research

collaborative education program, which has promoted the integration of traditional engineering speciality into new engineering concepts and constantly transformed them into new engineering speciality. As a traditional engineering speciality in China, chemical engineering speciality has always been a big gap with popular or emerging speciality in terms of student quality, training objectives, curriculum system, teaching mode and training resources, and innovation platform construction, etc. Relevant problems have been troubling educational administrators and professional teachers in domestic colleges and universities15-19. Meanwhile, the further development of these problems is bound to affect the progress and development of the chemical industry. Therefore, under the background of the construction of "new engineering", how to integrate the new engineering concept and carry out the reform of the innovation platform for the cultivation of chemical professionals has become extremely urgent.

2. REFORM IDEA AND EXPLORATION

The chemical engineering and technology speciality of Zhengzhou University was founded in 1958, which was one of the first higher engineering education speciality established in Henan Province after the foundation of New China. It is a national characteristic speciality and a national comprehensive reform pilot speciality. It passed the engineering education professional certification in 2011 and 2017 respectively. In 2019, it was successfully selected as one of the first first-class professional construction sites in China.

In the past 60 years since its establishment, the program has accumulated a profound foundation for running a school, formed a complete "university-master - doctoral" talent training system, and constructed a sound management system of decision-making, teaching organization and management, teaching research activities, listening to lectures, training of young teachers, teaching supervision, teaching quality management and evaluation. The teaching system is rigorous, teaching management is strict, a large number of outstanding chemical professional and technical personnel had been trained for the country and Henan Province.

With the construction of a regional joint innovation platform for industry-university-research cooperative education practice and an engineering practice education center as the starting point, Zhengzhou University strives to innovate the integration mode of production and education, further promote the "introduction of enterprises into school", explore a new way of "in-depth integration of production and education to promote practical teaching reform", and give full play to the key role of school-enterprise collaborative education in the cultivation of students' innovative practical ability and comprehensive quality.

The overall reform idea of Zhengzhou University in the construction of innovation platform for chemical talent training under the background of new engineering is to build an innovation platform and system for chemical professional talent training of "base + platform + education alliance". the reform ideas and measures are as follows

2.1. Build a practice and innovation education base for chemical professionals

Together with well-known domestic enterprises and scientific research institutes, jointly build a stable internship, practice and training base for new engineering speciality, and a new platform is training "double-skilled and double-capable" teacher team. The construction of school-enterprise cooperative practice and innovation education base provides on-site internship opportunities for undergraduates majoring in chemical engineering and technology, which can give full play to the advantages of disciplines and talents, lead the student team to help enterprises solve practical problems in production, so that all aspects of ability of students were trained in the process of in-depth understanding of the actual operation of enterprises, and when production problems were solved, students' learning enthusiasm was improved and their ability to apply what they learn was cultivated. Meanwhile it also allows teachers to enter enterprises and scientific research institutes, and co-research and develop new products, new technologies, and new process design, so that they not only understand the level of modern industrial technology and its development trend, but also solve practical engineering problems and enhance engineering innovation ability. At the same time, it encourages colleges and universities to adjust personnel training programs according to the needs of industries, further enhance the employment competitiveness of college graduates, and give play to the education function of the innovation platform for the cultivation of chemical professionals

2.2 together with multiple resources to build joint engineering laboratories inside and outside the school

Through the establishment of a "trinity" platform mode with deep integration of "laboratory construction + virtual simulation experiment + open teaching", a virtual-real integrated teaching mode were built with big data, Internet and informatization, and a virtual simulation experiment teaching center of chemical industry that combines virtual simulation with virtual reality were built, which realize the multiple interactive integration of "time - space - innovative practice teaching".

Build a "student mobility + creative project driven" campus innovation education and joint engineering laboratory integration mode, the campus innovation and entrepreneurship practice activities are carried out with innovative thinking, practical ability and project creativity as the evaluation target, and with the joint engineering laboratory as the support. Select students with good potential or strong creativity to set up excellent engineer class, give priority to setting up innovative practice projects, provide experimental platforms inside and outside the school, carry out innovative education and practice, cultivate a group of students with strong creative projects and innovative practice ability, promote the overall innovation and entrepreneurship atmosphere of the school and cultivate students' interest in participating in innovative practice. Increase the participation percent of students in innovation and entrepreneurship activities.

2.3 Under the guidance of the New Engineering Alliance, in-depth cooperation with more colleges and universities related to chemical industry, chemical industry associations (societies) and enterprises to establish collaborative education alliance and promote the deep integration of education chain, talent chain, knowledge chain and industrial chain

Establish contact with the new engineering alliance, explore the role of universities in the alliance and effect. Compare the working mode and framework of the alliance with the existing resources and capabilities of the participants, jointly build a multi-party collaborative education alliance mode. Actively contact with scientific research institutes, industry colleges and universities, high-quality enterprises, expressing the concept of collaborative education; At the same time, promote the participation of partners to join the alliance, multi-carry out the professional personnel training with the college, and establish a continuous training system of professional personnel training innovation and practice under the background of new engineering.

3. CONSTRUCTION OF INNOVATIVE PRACTICE PLATFORM MODE OF CHEMICAL TALENT TRAINING UNDER THE NEW ENGINEERING BACKGROUND OF "2+2+1"

3.1 Build a new engineering practice education center

Set up an engineering practice education center with the well-known domestic enterprises-Xinlianxin Chemical Industry Group Co., LTD. Henan, and research institutes-Henan Energy and Chemical Group Research Institute as the main body. Through "double guidance" in engineering practice teaching, "double tutor" in graduation design, and "double evaluation" in teaching effect, the school and enterprise co-education, and give full play to the education function of the innovation platform for the cultivation of chemical professionals.

3.2 Construction of two experimental bases for talent training

Vigorously promote the talent training mode of "innovative practice + Cooperation of School and Factory " in the off-campus practice teaching base; The experimental base consists of two organically coordinated parts inside and outside the campus. Colleges and universities give full play to the advantages of professional discipline teaching accumulated in decades, and build a subject-specific experimental education base. At the same time, a "trinity" platform teaching mode with deep integration of "laboratory construction + virtual simulation experiment + open teaching" has been established, by the teaching method of combination of virtualness and reality with big data, Internet and informatization, a practical education laboratory that can be both real and virtual has been built, and an experimental teaching center that combines virtual simulation has also been built.

By aggregating the resources of industrial partners, the university builds an off-campus practice experiment base with the actual scene of the industry as the experimental environment. Based on the needs of the industry for talent ability and quality, in order to let students can personally feel the gap between the current situation of the industry and their own understanding, break the restrain of existing concepts, open up a whole new mind, and comprehensively improve the ability of practice and innovation. The two experimental bases inside and outside the school are not isolated from each other, but rely on each other, and spiral forward. The platform takes innovative thinking, practical ability and project creativity as the evaluation dimension, and relies on the joint engineering laboratory to carry out on-campus innovation and entrepreneurship practice activities, select students with good potential or students with strong creativity for innovative practice projects, provide experimental platforms inside and outside the school to carry out innovative education and practice, and cultivate a group of students with strong creative projects and innovative practice ability. Promote the overall innovation and entrepreneurship atmosphere of the school, and improve the participation proportion of students in innovation and entrepreneurship activities.

3.3 Build a strategic alliance for the integration between industry and School co-education under the background of new engineering

One of the main characteristics of new engineering education is " multiple cooperation, industry-university -education ". The platform broke the previous sporadic cooperation situation, negotiated and discussed the collaborative education mode with related universities, associations (societies) and enterprises in the chemical industry, actively carried out organized and planned in-depth cooperation, built a strategic alliance for the integration of chemical talents' production and education under the background of new engineering, and carried out co-education under the framework of the alliance.

4. CONCLUSION

With the new engineering as the background and the cultivation of innovative spirit and practical ability of chemical talents as the core, Zhengzhou University explores the education mode of integration of production and education and collaborative education, focusing on the innovative development of chemical speciality training and the exploration of engineering practice platform under the background of new engineering. Construction and practice of application mode of chemical practice education base ; Construction and practice of integration mode between innovative practice activities on campus and off-campus practice platform; Under the background of new engineering, the construction and exploration of the chemical talents collaborative education alliance lays a theoretical foundation for the combination of traditional engineering education and "new engineering" education, as well as for cultivating high-quality talents with innovative spirit and entrepreneurial consciousness.

5. ACKNOWLEDGMENTS

Fund Project: 2024 Cultivating Project 2.0 for Excellent Engineers of zhengzhou University, Project number: 2024ZZUZY009

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